

martin.eccles@nbi.co.uk

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Gyrator circuit: simulate large coils electronically

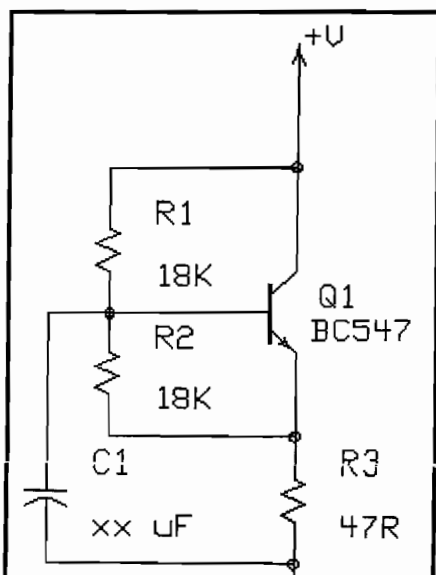
Sometimes coils with large inductance is needed in telecommunication systems and filters. Coils with inductance of many henries are not usually very useful in modern small electronics circuits. To overcome there is one solution which can be used in many applications: simulate the behavior of coils using electronics.

What's a gyrator ?

A **gyrator** converts an impedance into its inverse. This lets you replace an inductor with a capacitor, a couple op amps, and some resistors. A very handy gadget to have, especially if you're trying to put large value inductors into a very small package.

Simple circuit

This simulation of coils can be done in many ways, but the circuit below is maybe one of the simplest and most inexpensive.



This circuit is one transistor **gyrator** circuit which can be easily adjusted to simulate different inductance coils just by changing the value of capacitor C2. The value of inductance the circuit simulates is approximately simulates has value of 1 henry for every 2 microfarads in C2. So if you want to make 5 henry coil simulator, you just use 10 uF electrolytic.

The circuit needs some current passing through it to operate correctly. The circuit is suitable for example to be used as telecommunication holding coil or line current feeding coil.

The idea for this circuit is from P. Strict and is was published in Electronics World + Wireless World magazine September 1993 page 754.